

Ubiquitous Mobile Connectivity: A Plan for Nationwide 5G



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Executive Summary


Policymakers and technologists have lauded the emergence and growth of 5G wireless technologies and the latest advanced mobile services. The U.S. Government and industry stakeholders are focused on the critical need to ensure rapid 5G deployment nationwide. Research and modeling from several economists and firms align to detail the massive impact 5G will have on our economy and job creation, including contributing as much as \$1.5 trillion to U.S. GDP and creating 4.5 million jobs. Multiplier effects will extend the importance of 5G access across every industry. To fully realize these gains, and ensure they reach everyone on an equitable basis, 5G in the United States must mean 5G everywhere in the United States, and ubiquitous service is not possible without robust 5G services in rural areas. Rural America stands to benefit most from new innovations and services powered by 5G, and failure to ensure comparable wireless services in rural areas as those being deployed in urban centers could create a 5G gap, leaving rural America behind.

As with previous generations of mobile technology, government support programs such as the Universal Service Fund (“USF”) will provide needed resources to ensure that 5G reaches areas that are otherwise uneconomical to serve with private capital alone. For too long, however, policymakers have tried to advance this goal without knowing the scope of the challenge and without knowing what resources will be required to accomplish the mission. For the first time, the release of the CostQuest National 5G model provides rigorous, real-world analysis demonstrating the total investment of private capital and government resources needed to achieve ubiquitous 5G coverage where carriers are unlikely to deploy absent support: **\$36 billion**.

There is no doubt that we are at a key moment in our country to support broadband deployment. The passage of the landmark Infrastructure Investment and Jobs Act (“IIJA”) provides a historic investment in fixed broadband deployment. These critical investments provide a powerful platform to continue momentum to close the digital divide and can support backhaul for ubiquitous 5G mobile deployment in addition to fixed broadband access through smart public investments. With billions of dollars in USF support for deploying services in high-cost areas already budgeted and available without new additional appropriations, policymakers should take action immediately to reconsider current support models for 5G mobile services and fully fund this vital priority to ensure all Americans have access to fixed and mobile connectivity.

Today’s Historic Context

The COVID-19 pandemic transformed the lives of Americans and has made the need for broadband connectivity even more urgent. Policymakers have responded, and programs are now in place that support access to devices, economical broadband services, and expanded connectivity. Most recently, Congress passed H.R. 3684, the Infrastructure Investment and Jobs Act. IIJA contains the largest federal investment in broadband deployment in our nation’s history, with a \$65 billion investment that “will help ensure every American has access to reliable



high-speed internet.”¹ This investment includes a \$42,450,000,000 grant program to bridge the digital divide by expanding wired and wireless fixed broadband connectivity to reach Americans living in unserved and underserved areas.

Ensuring that all Americans have access to fixed broadband services is essential, and infrastructure used to deploy fixed broadband can also enable expanded access to mobile broadband services. But fixed internet access cannot replace a mobile connection; consumers increasingly rely on their smart phones and mobile connectivity as essential to their lives. And the importance of advanced new mobile networks will only grow as 5G mobile services do so much more than connect an individual to internet content or to enable a voice or video call, including precision agriculture and ever-growing Internet of Things (“IoT”) applications. Even as policymakers focus on closing the digital divide, providing connectivity only through fixed services risks creating a new divide – the 5G gap – in which the ubiquitous mobile services powered by 5G networks will drive economic growth in some parts of the nation but not in others.

The arrival of 5G wireless services already is having an immediate and expansive impact on the lives of Americans, powering cutting-edge innovations such as connected cars, smart cities, and telehealth hubs. Current use cases only scratch the surface of the applications and services that will be powered by 5G connectivity. While 5G has the potential to be as much as 100 times faster than 4G networks, it is much more than a faster wireless network architecture. It will enable enhanced mobile broadband, ultra-reliable low latency communications (such as remote surgery or virtual reality), and massive machine-type communications (such as the Internet of Things)—unlocking new communications capabilities previously thought unattainable.

While the promise of life with ubiquitous 5G raises exciting possibilities, the reality is that nationwide 5G availability is not inevitable, particularly in rural America. And while wireless carriers and infrastructure providers are investing billions of dollars to deploy 5G to the same regions and markets that always are first to benefit from new technologies, the lessons from previous generations of wireless services—from 1G cellular service to 4G LTE—teach us that without timely and properly targeted public support, we will fall short of the goal of nationwide availability. And as too often happens, rural and other vulnerable communities will be the ones left behind.

Just as ubiquitous service is not inevitable, neither is the 5G gap. Building on the lessons learned from previous generations of wireless deployments, and the momentum gained by the recent legislation to advance fixed connectivity, we have an opportunity to completely close the digital divide and make sure that every American can access 5G in a timely fashion, regardless of where they live, work, or travel.

¹UPDATED FACT SHEET: *Bipartisan Infrastructure Investment and Jobs Act*, The White House Briefing Room (Aug. 2, 2021), <https://www.whitehouse.gov/briefing-room/statements-releases/2021/08/02/updated-fact-sheet-bipartisan-infrastructure-investment-and-jobs-act/>.

For these important reasons, Competitive Carriers Association (“CCA”) commissioned CostQuest Associates (“CQA”) to develop a new cost model to determine what is necessary to ensure that 5G is available nationwide to *all* Americans, in all corners of our nation. Based on engineering principles, real-world costs, and the most recent 4G LTE coverage data submitted by the four largest carriers, **CQA has determined that the additional cost to ensure access to ubiquitous 5G for all Americans – and not just those who will be covered by currently planned private investment – is \$36 billion.**

Congress and the Administration should rightly be commended for the country’s historic investments in fixed broadband access to help close the digital divide for every single American, not just those fortunate enough to live in the right places. That same standard should apply for 5G, and many of the policy insights behind the recent surge of support for fixed broadband apply to mobile as well. Building on these advances, and armed with this new cost model, policymakers now have a fact-based foundation to build upon and drive informed policy. With smart investment, we can ensure that resources are available for ubiquitous 5G, provided by rural, regional, and nationwide carriers.

The Problem: CQA Model Demonstrates Further Support Needed for Ubiquitous 5G

The FCC already has identified at least an initial down payment on the investment needed to deliver ubiquitous 5G. On October 27, 2020, the Commission adopted the 5G Fund Order, which will dedicate up to \$9 billion in USF support for wireless carriers to deploy 5G service in rural and hard-to-reach areas. While an important step and a welcomed increase in resources allocated specifically for mobile service, this figure was not supported with evidence that this amount would be enough to provide truly comparable wireless services to rural areas as those enjoyed in urban locations.

In fact, the Commission did not point to any data to support the budget amount, and indeed the 5G Fund Order was adopted before mobile coverage maps were updated, so reliable data to identify the total needed budget was unavailable. At the time of the vote, then-Commissioner Jessica Rosenworcel expressed concern over “building this auction without grounding it in any real-world data ... We need that data to know what communities lack wireless service and how much reaching them will truly cost.”² Commissioner Geoffrey Starks expressed similar concerns of an “*Order* with a paper-thin justification for the Fund’s \$9 billion budget” and stating that “[w]ithout the new maps and data, we don’t really know how many and what kind of locations the money needs to cover.”³

Further work is needed—and is underway—to update the FCC’s coverage data to reflect real-world service and needs to determine the precise locations that should be eligible to compete for support in the 5G Fund more reliably. However, this cost model provides a rigorous data set, including detailed location-level information, that offers clear answers to questions raised as the

² Statement of Commissioner Jessica Rosenworcel, Approving in Part, Dissenting in Part, *Establishing a 5G Fund for Rural America*, Report and Order, 35 FCC Rcd. 12174, 12324 (2020) (“5G Fund R&O”).

³ *Id.* at 12326, Statement of Commissioner Geoffrey Starks, Approving in Part and Dissenting in Part.

5G Fund was adopted and demonstrates that a \$9 billion investment will fall far short of the goal for ubiquitous service.

CQA's 5G Ubiquity Cost Study (2021)

To determine the total investment necessary to make 5G available where it is not likely to be deployed absent support, CQA developed an efficient approach to estimate the number of cell sites across the United States needed to deploy a 5G Network to all areas currently unserved and not on a reliable private investment path to be served by 5G mobile wireless. This includes determining areas where mobile services are currently available using existing data sets, approximating the number of towers needed to serve remaining areas, and calculating the overall investment cost to provide service, including new tower structures and supporting infrastructure, siting, backhaul, and equipment and labor.

Under the framework of the FCC's current Report and Order in the Matter of Establishing a 5G Fund for Rural America⁴, the FCC "will determine the areas eligible for support in the 5G Fund Phase I auction based upon where new mobile coverage data submitted in the Digital Opportunity Data Collection show a lack of unsubsidized 4G LTE and 5G broadband service by at least one service provider." The FCC's August 2021 release of updated LTE coverage from the four largest wireless carriers using the standards required by the Broadband DATA Act is the best currently available data matching the requirements of the 5G Fund, and as Chairwoman Rosenworcel blogged "a preview of things to come."⁵ Using this updated LTE data provided by the FCC, CQA found that a total investment of \$36 billion will be needed to ensure ubiquitous 5G service.


The full methodology of the CostQuest National 5G Model can be found attached to this paper.

The Solution: Build on the IIJA to Allocate Sufficient USF Resources to Close the 5G Gap

Armed with these facts, policymakers can take immediate steps to allocate a sufficient budget for 5G support and can make significant progress using already available funds. IIJA provides historic levels of resources for fixed connectivity to unserved and underserved locations, and as such the IIJA fully supplants the FCC's Rural Digital Opportunity Fund Phase II ("RDOF2"), the \$11 billion program originally conceived as a plan to finish the job of ensuring for fixed broadband deployment to all unserved areas. Because of the IIJA, in other words, over \$11 billion remains in the USF budget for other policy objectives such as rural 5G. Even further, funding in IIJA for both fixed connectivity and for middle mile broadband infrastructure should reduce the total investment needed to achieve ubiquitous 5G services, particularly if fiber access is provided for

⁴ 5G Fund R&O, 35 FCC Rcd. at 12181.

⁵ Acting Chairwoman Jessica Rosenworcel, *New Mobile Map: A Preview of What's to Come*, Notes from the FCC, (Aug. 6, 2021), <https://www.fcc.gov/news-events/notes/2021/08/06/new-mobile-map-preview-whats-come>.



wireless backhaul through open access and interconnection and at the reasonable rates anticipated to utilize federally subsidized connections.

Leveraging federal investments in IJJA, private capital, and existing budgets for USF High-Cost programs, policymakers should fully fund the 5G Fund to preserve and expand mobile connectivity nationwide and prevent an emerging 5G Gap from undermining momentum to finally close the digital divide. Immediately re-sizing the 5G Fund to \$20 billion as an initial step would acknowledge the reality that the true need to ensure 5G for all Americans is far higher than the existing \$9 billion budget, and the FCC can then establish a final budget based on upcoming updates to mobile coverage data.